

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

MULCHING

(Ac.)

CODE 484

DEFINITION

Applying plant residues, by-products or other suitable materials produced off-site, to the land surface.

PURPOSES

- Conserve soil moisture
- Moderate soil temperature
- Provide erosion control
- Suppress weed growth
- Establish vegetative cover
- Improve soil condition and increase soil fertility

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where mulches are needed to meet the desired purpose listed above. This practice may be used alone or in combination with other practices.

CRITERIA

GENERAL CRITERIA APPLICABLE TO ALL PURPOSES

The selection of mulching materials will depend primarily on site conditions and the availability of the

material. Mulch materials shall consist of natural and/or artificial materials such as plant residue, wood bark or chips, gravel, plastic, fabric, animal manure, rice hulls, materials from food processing plants, or other equivalent materials of sufficient dimension (depth or thickness) and durability to achieve the intended purpose for the required time period.

Mulching is generally performed after grading, soil surface preparation, and seeding and plantings are complete. Soil surface shall be prepared in order to achieve the desired purpose.

The mulch material shall be evenly applied and anchored to the soil. Tackifiers, emulsions, pinning, netting, crimping or other acceptable methods of anchoring will be used if needed to hold the mulch in place for specified periods.

Manufactured mulches shall be applied according to the manufacturer's specifications.

Mulching operations shall comply with federal, state and/or local laws and regulations during the installation, operation and maintenance of this practice.

Mulch material shall be relatively free of disease, noxious weed seeds, and other pests and pathogens.

ADDITIONAL CRITERIA TO CONSERVE SOIL MOISTURE

Mulch materials applied to the soil surface shall provide at least 60 percent cover to reduce potential evaporation.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Mulch material shall be applied prior to moisture loss. Prior to mulching, ensure soil under shallow rooted crops is moist, as these crops require a constant supply of moisture.

ADDITIONAL CRITERIA TO MODERATE SOIL TEMPERATURE

Mulch materials shall be selected and applied to obtain 100 percent coverage over the area treated. The material shall be of a significant thickness to persist for the period required for the temperature modification.

ADDITIONAL CRITERIA TO PROVIDE EROSION CONTROL

When mulching with cereal grain straw or grass hay, apply in sufficient amounts to provide 70 percent ground cover. Mulch rate shall be determined using current erosion prediction technology (RUSLE 2 or Wind Erosion Prediction) to reach the soil erosion objective but no less than 2 tons/acre.

When mulching with wood products such as wood chips, bark, or shavings or other wood materials, apply to a 2-inch (5 cm) thickness if the soil is not well drained, and to a 3- to 4-inch (7-10 cm) thickness if drainage is good. More finely textured mulches, which allow less oxygen penetration than coarser materials, should be no thicker than 1 or 2 inches (2.5-5 cm). The mulch material shall provide no greater than 80 percent ground cover in order to ensure adequate air drainage. The minimum application rate shall be 35 cubic yards per acre (66m³/hectare).

Gravel or other inorganic material shall be applied approximately 2 inches (5 cm) thick and shall consist of pieces 0.75 to 2 inches (1.9—5.1 cm) in diameter. The mulch material shall provide no more than 90 percent ground cover in order to ensure adequate air drainage.

ADDITIONAL CRITERIA TO SUPPRESS WEED GROWTH

The thickness of mulch will be determined by the size of the plant being mulched. Small plants must not be smothered. Mulches shall be kept clear of the stems of plants where disease is likely to occur.

Mulches applied around growing plants or prior to weed seedling development shall have 100 percent ground cover. Thickness of the mulch shall be adequate to prevent emergence of targeted weeds. Plastic mulches may be used.

ADDITIONAL CRITERIA TO ESTABLISH VEGETATIVE COVER

Mulch shall be applied at a rate that achieves 50 percent ground cover to provide protection from erosion and runoff and yet allow adequate light and air penetration to the seedbed to ensure proper germination, emergence, and disease suppression.

ADDITIONAL CRITERIA TO IMPROVE SOIL CONDITION AND INCREASE SOIL FERTILITY

To increase soil fertility, apply mulch materials with a carbon to nitrogen ratio (C:N) less than 30 to 1 such as animal manure, bio-solids, food processing wastes, or similar materials, such as compost. Apply other practices such as contouring, filter strips or riparian forest buffers to assure that runoff from the mulched areas will not transport mulching materials to sensitive waterbodies.

Credit nutrients applied with the mulch to the nutrient budget.

CONSIDERATIONS

Consider the effects of mulching on evaporation, infiltration, and runoff. Mulch material may affect microbial activity in the soil surface, increase infiltration, and decrease runoff, erosion, and evaporation. Increased infiltration may increase nutrient and chemical transport below the root zone. The temperature of the surface runoff may also be lowered.

Mulched soil retains moisture, requires less watering and reduces the chance of water stress on plant materials. Mulch also minimizes evaporation from the soil surface and hence reduces losses from bare soil areas.

Mulch materials high in organic matter with a high water holding capacity and high impermeability to water droplets may adversely affect the water needs of plants.

Clear and infra-red transmissible (IRT) plastics have the greatest warming potential. They are transparent to incoming radiation and trap the longer wavelengths radiating from the soil. Black mulches are limited to warming soils by conduction only and are less effective.

Clear mulches allow profuse weed growth and may negate the benefits of soil warming. Black mulches provide effective weed control. Wavelength selective plastic (IRT) blend the soil warming characteristics of clear mulch with the weed control ability of black mulch.

Consider potential toxic allopathic effects that mulch material may have on other organisms. Animal and plant pest species may be incompatible with the site.

Consider the potential for increased pathogenic activity within the applied mulch material.

Keep mulches 3 to 6 (8 to 15cm) inches away from plant stems and crowns to prevent disease and pest problems.

Deep mulch provides nesting habitat for ground-burrowing rodents that can chew extensively on bark on tree trunk and/or tree roots. Light mulch applied after the first cold weather may prevent rodents from nesting.

PLANS AND SPECIFICATIONS

Specifications shall be prepared for each site and purpose and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation. Documentation shall include:

- Type of mulch material used
- Percent cover and/or thickness of mulch material
- Timing of application
- Site preparation
- Listing of netting, tackifiers, or method of anchoring

- Operation and maintenance required.

OPERATION AND MAINTENANCE

Mulched areas will be periodically inspected, and mulch shall be reinstalled or repaired as needed to accomplish the intended purpose.

Removal, incorporation, bio- or photo-degradation of mulch and associated materials shall be consistent with the intended purpose and site conditions.

Operation of equipment near and on the site shall not compromise the intended purpose of the mulch.

Prevent or repair any fire damage to the mulch material.

Properly collect and dispose of artificial mulch material after intended use.

Monitor and control undesirable weeds in mulched areas.

REFERENCES

1. Agriculture and Agri-Food Canada. 2000. Plastic Mulches for Commercial Vegetable Production. Canada-Saskatchewan Irrigation Diversification Centre. Outlook, Saskatchewan.
2. Natural Resources Conservation Service. 2002. National Agronomy Manual 190-V. USDA-NRCS. Washington, D.C.
3. Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder. 1997. Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE). U.S. Department of Agriculture, Agriculture Handbook No. 703. Pp. 175,177-179.
4. Shaffer, M.J., and W.D. Larson. 1987. NTQM, A Soil-Crop Simulation Model for Nitrogen, Tillage, and Crop Residue Management. U.S. Department of Agriculture, Agricultural Research Service.

Conservation Research Report 34-1. Pp. 83.

5. Toy, Terence J., and George R. Foster, Co-editors. 1998. Guidelines for the Use of the Revised Universal Soil Loss Equation (RUSLE) Version 1.06 on Mined Lands, Construction Sites, and Reclaimed Lands. U.S. Department of the Interior, Office of Surface Mining and Reclamation.
6. Wischmeier, W.H., and D.D. Smith. 1978. Predicting Rainfall Erosion Losses-A guide to Conservation Planning. U.S. Department of Agriculture, Agriculture Handbook No 537. Pp. 19, 26, 31, 50.
7. Wischmeier, W.H. 1974. New Developments in Estimating Water Erosion. In: Proceedings of the 29th Annual Meeting of the Soil Conservation Society of America. Syracuse, New York.
8. Virginia Erosion and Sediment Control Handbook.

NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA CONSERVATION PRACTICE STANDARD

MULCHING

Approved Practice Narrative

(Acre)

CODE 484

484 D1 Mulching: This area will be mulched with plant residues or commercial materials in order to control erosion, conserve moisture, suppress weed growth, and aid in temperature control, soil quality improvement, and the establishment of vegetative cover. NRCS will provide specification as to the material agreed upon, rates, and site preparation and anchoring requirements.

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484-VA-6

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